Objectives: Week 3

- To review the case study of Hepatitis exposure.
- To conclude the immune system: Immune deficiency vs. Autoimmune diseases.
- To discuss the functions of the respiratory system.
- Overview the major anatomical features of the respiratory system.
- To define the different forms of respiration.

Hepatitis Case Study

Form of Hepatitis
→ A

Treatment:
Antibodies that needed to be injected to insure rapid immunization.
Reason for a later vaccination:
Gammaglobulin is so effective he never developed a primary immune response. Virus was removed before B cell activation occurred. No memory cells No long term immunity.

Immune Deficiency

Congenital or acquired condition that decreases the effectiveness of the immune system.
Examples:
- SCID – genetic deficit of B or T cell production.
- AIDS – Acquired Immune deficiency Syndrome. Caused by HIV – which destroys Th cells.
- Hodgkin’s Disease – cancer of the lymph nodes

Autoimmune diseases

Immune system loses its ability to distinguish itself from foreign antigens. The body produces antibodies and sensitized Tc cells that set about to destroy the body’s own tissues.

Examples of Autoimmune diseases:
- Multiple sclerosis – destruction of myelin in nervous sys.
- Type I (juv) diabetes—destruction of pancreatic beta cells
- Rheumatoid arthritis – destruction of the joints

Functions of the Respiratory System

- To move air in and out of the lungs.
- To exchange gases between air and the blood.
- Exchange gases between blood and the body cells.
- To use oxygen and remove CO2 from the cells.

Anatomy of the Respiratory System
Pathway of Air Travel

Nose > Pharynx > Larynx > Trachea > Bronchi > Lungs > Alveoli

Pharynx

- In the throat, connects the nasal and the oral cavities to the larynx.
- Food and air passages join in the pharynx, which conducts air to the larynx and food to the esophagus.

Three parts: Nasopharynx, Oropharynx, Laryngopharynx.

Larynx

- Voice box
  - Contains vocal cords that are membranous folds supported by elastic ligaments that stretch across the glottis.
  - When air goes through the glottis the vocal cords vibrate, which produces sound.
  - Thyroid cartilage (the adam’s apple).
Trachea

*Tube for respiration and movement of air during inhalation and exhalation.*

Also known as the “windpipe.”

Extends from the larynx into the thoracic cavity.

Layers: Mucosa, submucosa, and adventitia.

Mucosa contains goblet cells – pseudostratified epithelium with cilia.

Contains C-shaped hyaline cartilage rings that support the opening for air passage.

Bronchi & Bronchioles

Branches off of the trachea that allow for passage of air to the alveoli – the many air sacs of the lungs.

The right primary bronchus is shorter than the left, both are supported with wedge-shaped cartilage.

Branching pattern of the conducting pathway in the lungs is often called the bronchial tree.

Lungs & Alveoli

Composed of the alveoli, where the site of gas exchange occurs.

> Left lung – two lobes
> Right lung - three lobes.

Alveolar wall and the capillary wall are composed of simple, squamous epithelium, together these two walls make up the respiratory membrane. Aka air-blood barrier
The Pleurae

Function: Reduce friction
- Creates pressure gradient,
- Compartmentalization

Layers
- Visceral Pleura - Pleural cavity - Parietal pleura
  - Parietal pleura (covers thoracic wall).
  - Visceral pleura – covers the external lung surface
  - Pleural fluid (fills the slit like pleural cavity) between them as a lubricant

Increased Surface Area

Lungs contain around 300 million alveoli, with a surface area of approximately 50-70 m²

High surface area improve the efficiency of the lungs and allows for more gas exchange to occur.

Respiration

Exchange of gases between the air and the cells of the body.

- Pulmonary Ventilation
- External Respiration
- Internal respiration